Atmospheric Sciences
PhD

The mission of the Department of Atmospheric Sciences doctoral program is to provide an educational environment that deepens student knowledge of the atmospheric sciences and related disciplines, enables growth of student skill sets (analytical, technical, and communication), and emphasizes leadership, research, and innovation among its students and faculty.

**Goal 1:** Students will develop deep knowledge in particular atmospheric sciences sub-disciplines through their research activities while also broadening their knowledge base through coursework.

**Goal 2:** Students will enhance their analytical, technical, and communication skills through their research activities and course work and will develop the ability to carry out independent and original scientific research.

**Goal 3:** Students will develop skills that will enable them to fill critical roles in leading research efforts, guiding science policy, educating future scientists, and creating opportunities in industry.

**Admission Requirements**

The applicant must meet the School of Graduate Studies’ current minimum general admission requirements as published in the graduate catalog. In addition, students must fulfill the requirements below for admission to the Atmospheric Sciences doctoral degree program.

1. A bachelor’s or master’s degree from a recognized institution. For U.S. degrees, accreditation must be by one of the six regional accrediting associations.
2. A cumulative GPA of at least 3.00 for all undergraduate work.
3. A GPA of at least 3.00 in all graduate level work.
4. A combined score of 300 in the quantitative and verbal sections of the Graduate Record Examination (GRE).
5. Be recommended for doctoral work by the department.
6. Satisfy the School of Graduate Studies’ English Language Proficiency requirements as published in the graduate catalog.
7. Students with a bachelor’s degree may apply directly to the Ph.D. program and must include within their application:
   a. At least one letter of recommendation that comments on their research ability, and
   b. A sample of their previous research, or, provide a research topic proposal and how that research will be executed, completed, and presented within the first year of the Ph.D. program.

In rare circumstances, students who begin the M.S. program in Atmospheric Sciences may bypass the M.S. and be admitted into the Ph.D. program with a unanimous recommendation by the departmental faculty and by first satisfying all other Ph.D. admission requirements of the UND School of Graduate Studies and Atmospheric Sciences Department including #7 above. Application materials should be submitted to the Graduate Committee in the Department of Atmospheric Sciences. The student need not have completed their M.S coursework at the time of application. The student would then be subject to the additional *degree requirements* stated in section 6 of “Degree Requirements” below.

**Degree Requirements**

Students seeking the Doctor of Philosophy degree through the Department of Atmospheric Sciences at the University of North Dakota must satisfy all general requirements set forth by the School of Graduate Studies as well as particular requirements set forth by the Department of Atmospheric Sciences. These degree requirements include:

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1. Completion of 90 semester credits beyond a bachelor's degree or 60 semester credits beyond a master's degree.
2. Two consecutive years of full-time academic work completed in residence at the University of North Dakota campus. With approval of a student's Faculty Advisory Committee, one of these years may be completed through full-time academic work and/or research at another institution or location.
3. At least 40 of the post-bachelor's credits or 27 of the post-master's credits must be formal coursework. A minimum of two-thirds of these credits must be taken in the Atmospheric Sciences department.
4. Up to 9 credits may be taken through distance education.
5. Completion of AtSc 500 and 505 or equivalent classes.
6. Students who have been admitted under admission requirements #7 or #8 above must successfully present research in written and oral form during their first year of the Ph.D. program, subject to approval by the Departmental Graduate Committee and the student's Doctoral Committee. Those students approved will finish coursework and progress toward comprehensive exams and Ph.D. candidacy while those not approved will be dismissed.
7. Satisfactory completion of a written and oral doctoral comprehensive examination in Atmospheric Sciences is required before advancement to Ph.D. candidacy is granted. Students may attempt the written comprehensive exam twice.
8. Students are required to complete independent research that culminates in a dissertation, a public departmental seminar, and final examination.

Faculty and Areas of Expertise

- **Mark A. Askelson, Ph.D.,** Use of unmanned aircraft systems in meteorological applications, radar meteorology, surface transportation weather, mesoscale weather prediction, model initialization, objective analysis, storm dynamics, cloud modeling, and cloud physics.
- **David J. Delene, Ph.D.,** Atmospheric aerosols, cloud physics, weather modification, satellite remote sensing of aerosols and clouds, air pollution, climate change
- **Xiquan Dong, Ph.D.,** Evaluating GCM simulated cloud and radiation budgets, investigating climate/weather extremes, evaluating and improving satellite retrieved clouds and precipitation using surface observations, retrieving cloud microphysical properties, and studying Asian Dust and pollution.
- **Aaron Kennedy, Ph.D.,** Radar meteorology; clouds radiation and climate; mesoscale dynamics and modeling; regional climate change; severe storms; and atmospheric reanalyses.
- **Gretchen Mullendore, Ph.D.,** Numerical modeling, convective transport, mesoscale dynamics, tropospheric-stratospheric exchange, cloud modeling, convection initiation.
- **Leon F. Osborne, Jr., M.S.,** Numerical weather prediction, atmospheric data assimilation, surface transportation meteorology, adaptation of advanced spatial technologies for improved decision-making applications.
- **Michael R. Poellot, M.S.,** Cloud physics, aviation meteorology, weather modification, and atmospheric radiation.
- **Baike Xi, Ph.D.,** Cloud microphysics retrieval from ground base measurements, atmospheric radiative transfer, cloud and radiation parameterizations in climate model, ground and satellite remote sensing of clouds and radiation, heterogeneous reaction in clouds, Asian dust/pollution transport.
- **Jianglong Zhang, Ph.D.,** Satellite remote sensing, data assimilation and aerosol prediction, atmospheric radiation, climate change, aerosol and cloud physics.
- **Aaron Kennedy, Ph.D.,** Radar meteorology; clouds radiation and climate; mesoscale dynamics and modeling; regional climate change; severe storms; and atmospheric reanalyses.

Contact Information

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